

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

Mr. Larry Lawson, Director
Division of Water Program Coordination
Virginia Department of Environmental Quality
629 Main Street
Richmond, VA 23219

Dear Mr. Lawson:

The United States Environmental Protection Agency (EPA) Region III is pleased to approve the Total Maximum Daily Load (TMDL) for the aquatic life (benthic) use impairment on the Unnamed Tributary to Deep Creek. The TMDL was submitted to EPA for review in April 2004. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address an impairment of water quality as identified in Virginia's 1998, Section 303(d) list.

In accordance with Federal regulations at 40 CFR §130.7, a TMDL must comply with the following requirements: (1) designed to attain and maintain the applicable water quality standards, (2) include a total allowable loading and as appropriate, wasteload allocations (WLAs) for point sources and load allocations for nonpoint sources, (3) consider the impacts of background pollutant contributions, (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated), (5) consider seasonal variations, (6) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and instream water quality), (7) consider reasonable assurance that the TMDL can be met, and (8) be subject to public participation. The enclosure to this letter describes how the TMDL for the aquatic life use impairment on the Unnamed Tributary to Deep Creek satisfies each of these requirements.

Following the approval of the TMDL, Virginia shall incorporate the TMDL into the Water Quality Management Plan pursuant to 40 CFR § 130.7(d)(2). As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL WLA pursuant to 40 CFR §122.44 (d)(1)(vii)(B). Please submit all such permits to EPA for review as per EPA's letter dated October 1, 1998.



If you have any questions or comments concerning this letter, please don't hesitate to contact Mr. Peter Gold at (215) 814-5236.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure



Decision Rationale

Total Maximum Daily Loads for the Aquatic Life Use Impairment on an Unnamed Tributary to Deep Creek

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those water bodies identified as impaired by a state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS), that may be discharged to a water quality-limited water body.

This document will set forth the Environmental Protection Agency's (EPA's) rationale for approving the TMDL for the aquatic life use (benthic) impairment on the Unnamed Tributary to Deep Creek. EPA's rationale is based on the determination that the TMDL meets the following eight regulatory conditions pursuant to 40 CFR §130.

- 1) The TMDL is designed to implement applicable water quality standards.
- 2) The TMDL includes a total allowable load as well as individual waste load allocations and load allocations.
- 3) The TMDL considers the impacts of background pollutant contributions.
- 4) The TMDL considers critical environmental conditions.
- 5) The TMDL considers seasonal environmental variations.
- 6) The TMDL includes a margin of safety.
- 7) There is reasonable assurance that the TMDL can be met.
- 8) The TMDL has been subject to public participation.

II. Background

The Unnamed Tributary to Deep Creek is located in Nottoway County, Virginia. The impaired segment runs 2.13 miles from the discharge of the Town of Crewe Waste Water Treatment Plant (WWTP) to its confluence with Deep Creek. The 1,900-acre watershed is rural with woodlands (62 percent) and agricultural (21 percent) lands making up 83 percent of the watershed area. The remainder of the watershed is split between developed (14 percent) and wetlands (3 percent).

In response to Section 303(d) of the CWA, the Virginia Department of Environmental Quality (VADEQ) listed the Unnamed Tributary to Deep Creek (VAP-J11R) on Virginia's 1998 Section 303(d) list as being unable to attain the general standard for the aquatic life use. This decision rationale will address the TMDL for the impairment of the general standard for the aquatic life use. The failure to attain this use was determined through biological assessments of

the benthic macroinvertebrate community.

Virginia's 305(b)/303(d) guidance states that support of the aquatic life beneficial use is determined by the assessment of conventional pollutants (dissolved oxygen (DO), pH, and temperature); toxic pollutants in the water column, fish tissue, and sediments; and biological evaluation of benthic community data.¹ Therefore, a biological assessment of the benthic community can be used to determine a stream's compliance with the state's general standard for the aquatic life use. Virginia uses EPA's Rapid Bioassessment Protocol II (RBPII) to determine status of a stream's benthic macroinvertebrate community.² This approach evaluates the benthic macroinvertebrate community between a monitoring site and its reference station. Measurements of the benthic community, called metrics, are used to identify differences between monitored and reference stations.³ The state is currently in the process of changing this methodology to a stream condition index (SCI) approach.

As part of the RBPII approach, reference stations are established on streams which are minimally impacted by humans and have a healthy benthic community. These reference stations represent the desired community for the monitored sites. However, in the case of the Unnamed Tributary to Deep Creek, the reference station was located just upstream of the WWTP and was deemed to be impaired as well during the TMDL. Therefore, both segments were evaluated based on the SCI. Unlike the RBPII analysis, the SCI has a scoring system based on a statistical analysis of a large benthic database.⁴ Therefore, the SCI does not evaluate the benthic community on a one to one basis but evaluates the monitored community against the condition of several nonimpaired waters at once. Both the SCI and RBPII monitored sites are evaluated as non-impaired, slightly impaired, moderately impaired, or severely impaired.

According to the RBPII analysis monitoring station, XGP001.80 is no longer impaired. However, when the station was evaluated using the SCI approach it was considered to be moderately impaired, the upstream station (XGP002.20) was moderately impaired according to this approach as well.

The RBPII analysis assesses the health of the macroinvertebrate community of a stream. The analysis will inform the biologist if the stream's benthic community is impaired. The analysis does not inform the biologist as to what is causing the degradation of the benthic

¹VADEQ. 1997. 1998 Water Quality Assessment Guidance for 305(b) Water Quality Report and 303(d) TMDL Priority List Report. Richmond, VA.

²Tetra Tech 2002. Total Maximum Daily Load (TMDL) Development for Blacks Run and Cooks Creek. Fairfax, Virginia.

³Ibid 2

⁴MapTech, 2004, General Standard Total Maximum Daily Load Development for Unnamed Tributary to Deep Creek.

community. Although, further interpretation of biological community can identify likely stressors, additional analysis is required to determine the pollutants which are causing the impairment. TMDL development requires the identification of impairment causes and the establishment of numeric endpoints that will allow for the attainment of designated uses and water quality criteria.⁵

The Town of Crewe Waste Water Treatment Plant (WWTP) discharges to Deep Creek, its main outfall is located at river mile 2.13 of the Unnamed Tributary to Deep Creek. However, sewers upstream of this location have been known to overflow and discharge raw sewage to the Unnamed Tributary to Deep Creek. Based on the narrative associated with some of the biological monitoring reports, sewage overflows discharging untreated waste were identified as the stressor impacting the Unnamed Tributary to Deep Creek. These overflows have been occurring in the watershed for sometime. Although, they have not been regularly reported until recently. The discharges of large quantities of untreated sewage has the ability to temporarily eliminate the benthic community. Although the habitat for a benthic community is sub-optimal, because of the stream's fine sandy substrate, it is believe that the water will support a healthy benthic community if the discharges of untreated sewage are eliminated.

The TMDL evaluated the temperature, DO, pH, and nutrient levels in the Unnamed Tributary to Deep Creek. These were all found to be within a range that can support a healthy aquatic assemblage. Although, there were differences in these parameters upstream and downstream of the Town of Crewe discharge point. It was determined that, in order for the stream to attain criteria the discharge of raw sewage must be eliminated, Table 1 documents that determination.

Table 1-Summarizes the Raw Sewage Allocations for the Unnamed Tributary to Deep Cr

| Stream | Pollutant | TMDL (gal/yr) | WLA (gal/yr) | LA (gal/yr) | MOS*(gal/yr) |
|---------------|------------|---------------|--------------|-------------|--------------|
| UT to Deep Cr | Raw Sewage | 0.0 | 0.0 | 0.0 | Implicit |

* Virginia includes an explicit MOS by reserving the 10 percent of total loading to the MOS.

The United States Fish and Wildlife Service has been provided with copy of the TMDL.

III. Discussion of Regulatory Conditions

EPA finds that Virginia has provided sufficient information to meet all of the eight basic requirements for establishing aquatic life use (benthic) impairment TMDL for the Unnamed Tributary to Deep Creek. EPA is therefore approving this TMDL. EPA's approval is outlined according to the regulatory requirements listed below.

1) The TMDL is designed to meet the applicable water quality standards.

⁵Ibid 2

The impaired segment was listed as impaired due to a degradation of its benthic macroinvertebrate community. As mentioned above, benthic assessments inform the biologist of an impairment, but they are unable to identify stressors conclusively. The stressor of concern was identified in previous biological monitoring reports and verified through the development of the TMDL. The stressor was identified as raw sewage discharged through the Town of Crewe WWTP and its sewer system. It was determined that if this activity is terminated, the stream will be able to sustain a health benthic community. There was no water quality model since the source needed to be completely eliminated. However, other potential stressors were evaluated to verify the findings of previous biological assessments. As mentioned earlier, it was determined that the temperature, DO, pH, and nutrient levels were within the range to support a healthy benthic community.

2) The TMDL includes a total allowable load as well as individual waste load allocations and load allocations.

Total Allowable Loads

In this instance the total allowable is zero since the TMDL calls for the elimination of raw sewage.

Waste Load Allocations

Virginia has stated that there is one facility that has been discharging raw sewage to the Unnamed Tributary to Deep Creek. The source is the Town of Crewe WWTP, the TMDL calls for the termination of overflows that lead to the discharge of raw sewage from the WWTP and/or sewer lines. In 2003, the TMDL documents between 259,000 and 359,000 gallons of raw sewage discharged to the Unnamed Tributary to Deep Creek from the WWTP. The TMDL calls for the termination of this loading.

EPA regulations require that an approvable TMDL include individual waste load allocations (WLAs) for each point source. According to 40 CFR 122.44(d)(1)(vii)(B), “Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA pursuant to 40 CFR 130.7.” Furthermore, EPA has authority to object to the issuance of any National Pollutant Discharge Elimination System (NPDES) permit that is inconsistent with the WLAs established for that point source.

Table 2 - WLAs for the Unnamed Tributary to Deep Creek

| Facility | Permit Number | WLA |
|--------------------|---------------|-----|
| Town of Crewe WWTP | VA0020303 | 0 |

Load Allocations

There was no load allocation (LA) provided for sources of raw sewage nor were there any known nonpoint sources of raw sewage.

3) The TMDL considers the impacts of background pollution.

There were no background contributions of raw sewage.

4) The TMDL considers critical environmental conditions.

According to EPA's regulation 40 CFR 130.7 (c)(1), TMDLs are required to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the impaired segments is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards⁶. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable "worst-case" scenario condition. For example, stream analysis often uses a low-flow (7Q10) design condition when the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum. The TMDL called for the elimination of the stressor (raw sewage) to the stream. Therefore, under no conditions will the stream be exposed to this loading.

5) The TMDL considers seasonal environmental variations.

The TMDL called for the elimination of the discharge of raw sewage. Therefore, there is no seasonality in the loadings to the stream.

6) The TMDL includes a margin of safety.

This requirement is intended to add a level of safety to the modeling process to account for any uncertainty. The MOS may be implicit, built into the modeling process by using conservative modeling assumptions, or explicit, taken as a percentage of the WLA, LA, or TMDL. Virginia includes an implicit MOS by removing the pollutant completely.

⁶EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

7) There is a reasonable assurance that the TMDL can be met.

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. Furthermore, EPA has authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

Nonpoint source controls to achieve LAs can be implemented through a number of existing programs such as Section 319 of the CWA, commonly referred to as the Nonpoint Source Program.

8) The TMDL has been subject to public participation.

The Unnamed Tributary to Deep Creek was subject to Virginia's public participation process. There were two public meetings associated with the TMDL one held on May 21, 2003 the other on November 6, 2003. The meetings were held at the Chesterfield Police Building Government Complex in Chesterfield, Virginia. The meetings were noticed in the Virginia Register and the TMDL was open to thirty-day comment period.